Polymyositis Acuta, with Report of a Case Presumably of Syphilitic Origin (Myositis Syphilitica).

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FROM

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES,

APRIL, 1896.

Extracted from The American Journal of the Medical Sciences, April, 1896.

POLYMYOSITIS ACUTA, WITH REPORT OF A CASE PRESUMABLY OF SYPHILITIC ORIGIN (MYOSITIS SYPHILITICA)[1]

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Acute inflammation of muscle may be the result of direct extension from some inflammatory focus, primary in some neighboring organ or tissue. Under this head would be classed myositis secondary to suppuration in bone, gland, joint, pleura, etc.; to actinomycotic, anthracic, gangrenous, or neoplastic foci in neighboring parts. Under this head also must be classed the periarteritis nodosa of Kussmaul.

Hæmatogenic myositis occurs in pyæmia (multiple muscle-abscess), acute rheumatism, typhoid fever, and the other acute infectious diseases (degeneratio Zenkeri). Purulent myositis from distant pyogenic focus may occur in this way.

In like manner (hæmatogenic) tuberculosis of muscles may arise, as may syphilis. And a primary, presumably hæmatogenic, as yet cryptogenic, inflammation of many muscles, known as polymyositis acuta, has recently been described. To this affection and to syphilitic myositis, both rarely met with, I desire to direct attention. As a text I present the following history:

Mrs. J. M., aged twenty-four years, native of Norway, housewife, entered the Cook County Hospital, Chicago, on November 11, 1894. From Mrs. M. herself and from Dr. S. G. West, who had treated her outside and who very kindly furnishes me some of the facts in the case, the following was learned:

The family history was negative. She began to menstruate at thirteen; menstruation had proceeded naturally and regularly, uninterrupted by pregnancies, up to date of admission to the hospital. Her habits were regular, moderate drinking of beer being the only indulgence in alcoholics. She had lived in Chicago five years. Aside from the ordinary diseases of childhood she had previously been free from illness.

To this statement of hers as to previous health, however, direct questions bearing upon possible syphilis seemed to indicate that an exception must be made. While denying any knowledge of a venereal sore, of alopecia or skin eruption, she said that about ten years before she had had a sore mouth and throat that lasted one month; and a year later small, painless swellings of the size of a bean had appeared on the anterior surface of either tibia. Motion or pressure had caused slight pain. No ulceration or discoloration of the skin accompanied or succeeded their appearance. They had gradually disappeared after five or six months.

This, taken in connection with the fact that the husband admitted having been treated for syphilis, and with the general adenopathy to be described later, made the probability of syphilis almost a certainty.

Five weeks ago, about October 4th, she felt a sharp pain in the outer side of the right forearm just below the elbow. The arm at this point became rapidly swollen and tender. Two days later the calf of the right leg was similarly affected, and three weeks later the calf of the left leg. She felt no pain or distress except in the parts affected. The appetite was good; no stomach-disturbance; the bowels regular; she slept well. Dr. West, who saw her a few days later, found a temperature of 100° to 102° F. About two inches below the external condyle of the humerus was a swelling the size of an English walnut, moderately firm, fairly well circumscribed, and apparently situated in the supinator longus muscle. The right calf was more diffusely swollen, was quite hard and painful on pressure or on attempts to move the foot. By the doctor's directions an ointment containing iodine and iodide of potassium (unguentum iodi) was used freely over the affected parts. Later the left calf was similarly affected.

Status præsens. November 13, 1894. Patient is a rather sparely built woman, slender, about five feet in height, weight one hundred pounds. Is slightly emaciated; rather pale. Makes no complaint except of pain in the affected muscles, especially when they are touched or moved. Appetite fair; sleep only occasionally disturbed by pain. General adenopathy; cervical glands but slightly enlarged, axillary and inguinal affected to a greater degree, either cubital gland the size of a small bean. Head, face, eyes, ears, throat, larynx negative; no scars in throat. Heart and lungs negative. Abdomen negative. No splenic or hepatic enlargement. Bones negative. Pelvic organs negative. Uterine cervix smooth, unlacerated, conical; os uteri small. Slight leucorrhœal discharge which is said to be of long standing. No vaginal cicatrices. Rectum negative. Urine shows neither sugar, albumin, nor casts. Blood in fresh and stained specimens showed no change in color, shape, or size of corpuscles; no parasites. There was a slight oligocythæmia, with corresponding oligochromæmia; a slight increase in the polynuclear white cells—a leucocytosis.

The supinator muscle of the right forearm showed a very slight induration, which in the course of a few days had completely disappeared, the muscle performing its function in a normal manner. The right leg, the one first affected, was swollen in the region of the calf-muscles, though the patient said the swelling had gone down a great deal. There was a hard, board-like, brawny feel—a hard œdema. Extensive movement of the foot caused great pain, as did pressure. The calf-muscles of the legs looked as they do in pseudo-hypertrophic muscular paralysis. There was a uniformly rounded, bulging contour of the calf, which showed in striking contrast to the small frame of the woman and the other moderately developed muscles. Everywhere over this area there was great tenderness on pressure, the patient saying it was "as sore as a boil." The subcutaneous tissue seemed œdematous, but the pitting made by pressure was recovered with a sort of elastic bound of the skin. The skin was but slightly reddened over the affected area. No rash was to be seen, nor could any history of a rash be elicited. The patellar reflexes were exaggerated. There was slight ankle-clonus.

The temperature on admission was 99.6°, and varied during her five

weeks' stay in the hospital between 97° and 101°, usually being between 98.6° and 100°. There was no regularity about these slight rises, and the patient never presented any of the ordinary constitutional effects of fever. The respiration varied between 18 and 24. The pulse was, on the average, 90. Persistent inquiry as to the eating of poorly cooked pork was always met with the answer that no pork of any sort had been eaten, and that no one else in the household was similarly ill.

November 23d, under strict asepsis, with ether as an anæsthetic, I made an incision into the left gastrocnemius in order to obtain a piece of the muscle for examination. A moderate inflammatory œdema was met with in the skin and subcutaneous tissue. On cutting through into the muscle about two to six drachms of light brownish-red fluid, with a few small dark-red fragments of old clotted blood, escaped. A small piece of the gastrocnemius was cut out for examination. Cultures from the fluid outside the muscular fascia were negative. Agar and gelatine cultures from the fluid that was contained in the muscle proved sterile. Cover-slip preparations and sections of muscle stained for bacteria failed to reveal any micro-organism. The microscopic appearance of the stained section will be spoken of later.

Fearing the wound was already an infected one, I packed with gauze. It later, at some dressing, became infected, and for a few days discharged a yellow pus, healing in about ten or fourteen days.

The patient had, while in the hospital, no medicine internally up to November 20th, save an occasional cathartic, or a dose of antipyrin to relieve pain. November 20th she was given eighty grains of iodide of potassium a day. It is to be remembered, however, that before this drug had been given the initial swelling in the supinator muscle had completely disappeared; the one in the right calf had diminished in size by one-half, and the left calf was not paining so much. Wet boric-acid dressings had been constantly applied from the time of entrance to the hospital.

December 12, 1894, she left the hospital, able to walk, though with a limp.

I saw her at her home a few weeks later. The supinator and right calf-muscles were apparently normal. The left calf showed still a little hardness, and forced extension of the foot caused a feeling of tension in the calf with slight pain. The patient was inclined to favor the left leg a little in walking. There was no atrophy discoverable. Reflexes normal, glands much smaller.

Sections of the excised piece of muscle showed extensive and diffuse inflammatory changes. The muscle-fibres varied in size, were of homogeneous appearance (hyaline degeneration); in only a few specimens could faint transverse striæ be found. There was pronounced nuclear proliferation, many mitotic figures being seen. Large round and oval cells, believed to be proliferating nuclei, formed a prominent part of the picture. Spaces were seen here and there, looking as though a fibre had disappeared. Some fibres seemed to be split longitudinally. Everywhere between the bundles of fibres and between the separate fibres, and particularly about the vessels, there were aggregated polynuclear cells. Hemorrhagic extravasation was prominent in one portion of the speci-

men, and blood-pigment could be seen here and there where no hemorrhage could be made out. The piece excised showed, therefore, advanced diffuse hemorrhagic myositis. No trichinæ were found, nor, as said, any bacteria.

Recapitulation of Case. Woman, aged twenty-four years syphilitic, has suddenly developed in supinator longus a painful swelling; two days later right calf-muscles and three weeks later left calf-muscles similarly, but more diffusely, involved. Swelling, pain, tenderness, board-like hardness over muscles. No abnormal sensations, no nerve-tenderness; reflexes slightly increased; general adenopathy; no eruption; no profuse sweats; subsidence of evidences of inflammation in arm and right leg, the only medication being the inunction with the iodine unguent. No history or evidence of traumatism nor of infection save syphilis. Examination of muscle shows diffuse inflammation attended by hemorrhage; no parasites, animal or vegetable, discovered.

Diagnosis. Polymyositis acuta diffusa hemorrhagica syphilitica.

While this case does not, I believe, belong in the category of the classical primary acute polymyositides, it presents so many points of resemblance to these cases that I feel warranted in reviewing briefly what is known concerning this interesting, and until recently wholly unknown, affection. The disease to which the name polymyositis acuta has been given was first accurately described in 1887 by Unverricht, Hepp, and E. Wagner. Unverricht's case was as follows:

A previously healthy stonemason, aged twenty-four years, had pain in arms, legs, later in abdominal muscles On twenty-second day, swelling of affected muscles. Face, including lids, œdematous. Urticaria-like eruption on forehead. Profuse sweats; spleen enlarged; fever up to 38.5° C. Later involvement of muscles of deglutition and respiration; lobular pneumonia; death on thirty-fourth day. No nerve-symptoms.

Autopsy. (Marchand.) Myositis acuta præcipue musculorum extensorum extremitatum; anasarca et œdema intermusculare; hyperplasia lienis; pneumonia lobularis confluens duplex. The muscles were swollen, dull, lustreless, grayish, with hemorrhagic reddish areas. Diaphragm and eye muscles negative. No trichinæ. No culture-experiments. Microscope showed interstitial round-cell infiltration, large and small hemorrhagic extravasations, muscle-substance in all stages of degeneration, striæ in places completely lost, fibres swollen, often granular, hyaline, or fatty.

Unverricht compares his case with those of Scriba. The latter's case was one of multiple muscle-abscesses healing under evacuation of pus. A lesion of the skin or mucous membrane was, in Scriba's case, reasonably regarded as the infection atrium. Unverricht differentiates his case from the periarteritis nodosa of Kussmaul and Maier, where, with pain, swelling, hyperæsthesia, paralysis, albuminuria, there were found under the skin of the abdomen grape-sized nodes that under the microscope

were shown to originate in the wall of the artery, and secondarily to involve the muscle.

Debove's and Eisenlohr's cases he believes to be neurotic, spinal in the one, peripheral in the other. In Eisenlohr's case, neuritis was found with atrophic paralysis.

The disease he believes to be of infectious origin, and raises the question whether or not some of the cases of so-called trichinosis have not been cases of polymyositis.

"Whether in all cases the course is progressive or whether lighter forms of the disease that up to this time have sailed under another flag do not occur, it is impossible to decide from the observations of a single case." (Page 549.)

Hepp, at about the same time, from Kussmaul's clinic in Strasburg, reported a case under the title, "Pseudo-trichinosis, a peculiar form of acute parenchymatous polymyositis." He found but two cases at all resembling his, those of Potain and Marchand, both, though reported under different names, now generally regarded as cases of polymyositis acuta. His case he calls "Ein blosses curiosum."

Hepp's Case. Female, married, aged thirty-six years. After two or three weeks of anorexia, malaise followed by sore throat, dry mouth, red gums, exanthem on face and chest—pain and swelling appeared in the muscles of the shoulders, neck, extremities, attended by the hard œdema. There were sweats, sleeplessness, dysphagia, cramps, albuminuria, fever even to 40° C. The sensorium was free, sensibility unaltered, patellar knee-jerk lost. Death from lobular pneumonia and suffocation, after eleven weeks.

Autopsy (Recklinghausen). Firm œdema; panniculus adiposus scanty; subcutaneous connective tissue moist; muscles reddish-yellow with hemorrhagic areas, moist, easily fractured; ocular and diaphragmatic muscles unchanged. Lobular pneumonia, right hydronephrosis.

Microscopically. No trichinæ. Muscles showed hyaline or waxy degeneration, striæ faint or lacking, muscle in places granular. Round cells in perivascular connective tissue and in vicinity of degenerate muscle. Peripheral nerves and cord negative.

Hepp's second case was an epileptic, aged twenty-one years, who, during a fit, bit the tongue. Glossitis and inflammation of many muscles of the body followed. Psuedo-fluctuation led to exploratory puncture of muscles, but no pus or bacteria were found. A sciatica due to pressure of swollen muscles led to exposure of sciatic nerve for purposes of stretching and the nerve was found normal. An urticarial eruption was present. Spontaneous recovery followed.

E. Wagner's case, reported in 1887, with Unverricht's and Hepp's furnishing the standard of comparison for all subsequent writers, is as follows:

A female cook, aged thirty-four years, a sufferer from chronic pulmonary tuberculosis of light grade, developed pain, swelling, firm œdema over the muscles of the shoulders and upper extremities. An erysipelas-like exanthem appeared on either arm. No electric changes, no nerve-tenderness. Gradually subsided, but dysphagia and suffocative attacks developed, and in one of latter, patient died.

Autopsy. Moderate chronic pulmonary tuberculosis; diffuse bronchitis; pulmonary emphysema with slight œdema; brown atrophy of heart; right

ventricular dilatation; fatty liver; tubercular ulcers in ileum and colon; perimetritic adhesions; hyperæmia of brain and cord; extensive myositis with slight œdema of upper portion of body.

The affected muscles showed interfibrillary hemorrhages. The muscle-fibres were many of them homogeneous, with striæ faint or invisible. There was marked round-celled infiltration, with some large multinuclear giant-cells. It is of special interest that in one and the same muscle-bundle various changes were occurring simultaneously. Thus were found fatty degeneration, waxy degeneration, diffuse and localized serous infiltration with well-marked regenerative changes in the muscle-substance and in the connective tissue.

No tubercle-bacilli were found. In three hundred transverse and longitudinal sections three trichinæ were detected. Wagner excludes trichinæ as the cause of the myositis on the following grounds:

1. The non-characteristic beginning of the disease, with no stomach- or bowel-disturbances.

2. The order of involvement of muscles and the sparing of the lower extremities.

3. The small number and the age of the trichinæ, the latter according to Leuckart, to whom the specimens were submitted, being at least four months old.

As there was some atrophy and some slight change noted in one of the peripheral nerves examined, Wagner is willing, though regarding the case as one of polymyositis, to admit that neuritis may have been a feature of the case.

Wagner now believes, and others as well, that another case of his reported thirty years ago was one of acute polymyositis.

Löwenfeld records a fatal case in which, with some breaks in the history and with no autopsy, there was yet enough to warrant a diagnosis of polymyositis. The case (in a male, aged fifty years) is peculiar in that the myositic trouble began apparently in the heart-muscle, gradually extended to other muscles of the body, the inflammation in separate muscles running an acute course and being followed by atrophy, which was, in the case of most of the muscles, partially or wholly recovered from. In this way, with alternating improvement and relapse, the patient lived for two years, death being preceded by dysphagia, irregular and weak heart. No changes in sensibility, no tenderness over spine or nerves could at any time be made out. A pigmentation of irregular distribution not unlike that of Addison's disease was present during a portion of the time, fading out toward the last. Löwenfeld admits that his case may possibly be a case in which there was involvement of nerves as well as muscles—a neuro-myositis.

Strümpell's patient, without known cause, was seized with nausea, vomiting, headache. Then pain in the arms and legs. Swelling most marked in muscles of the legs. Pain in chewing, speaking, swallowing. Tenderness over all affected muscles. Stomatitis. Sensibility normal. Patellar reflex weak. Reaction to both currents feeble. Ptosis; ocular paralysis. Death.

Cord and nerves negative. Muscles showed finely granular cloudiness, loss of transverse striæ, hyaline degeneration, vacuolation, increase in muscle-nuclei, numerous foci of true interstitial myositis.

Plehn's case was one of an acute infectious form with high fever, splenic tumor, œdema, roseola, herpes, recovery in twelve days, with no atrophy, contractures, paralyses, or disturbances of sensibility.

George W. Jacobi reports a case of subacute progressive polymyositis with fatal outcome. Microscopically there were waxy and fatty degeneration of

muscles, increase in connective tissue; secondary changes in nerve-branches probable.

Fenoglio's case was attended by pain, œdema, slight atrophy in various muscle-groups. Inflammatory changes were present in both muscles and interstitial tissue.

Prinzing's case, a male, aged fifty years, lasted five months. It was diagnosed in succession as rheumatism, periostitis, thrombosis. Many muscles were involved. There was moderate fever, no splenic enlargement. Patellar reflex absent. Dysphagia and cardiac irregularity were present.

Post-mortem, hemorrhagic areas were seen. The muscle-fibres varied in size, showed vacuoles often filled with detritus, loss of striæ. There was longitudinal splitting of fibres, nuclear proliferation. No bacteria. One nerve seen, was normal.

Prinzing refers to Gies's case as somewhat similar. In this case the quadriceps and triceps femoris were involved, being hard, tender, œdematous, the muscle showing waxy degeneration, the bone which was at first thought to be diseased being negative.

Waetzoldt's first case was in a woman where following, or at the same time with, a puerperal sepsis a polymyositis developed. Micrococci were found in the muscles post mortem.

His second case was likewise a post-partum case, where a perimetritic exudate seems to point to the uterus as the avenue of infection and the polymyositis as secondary. The patient recovered.

Waetzoldt cites cases of Winckel's and Fenoglio's as similar to his.

Senator's two cases are cases of myositis and neuritis:

CASE I.—Male, aged twenty-seven years; pulmonary tuberculosis; disturbance of sensibility, paralytic contracture of lower extremities with atrophy, nerve-trunks tender, reflexes abolished, reaction of degeneration, fever.

Autopsy. Ulcerative pulmonary tuberculosis; acute splenic tumor; parenchymatous and interstitial neuritis, cord negative; acute interstitial myositis with muscular atrophy. No tubercle-bacilli in nerves or muscles.

CASE II.—Male, aged thirty-three years. Muscular pains, nerve-trunks at first not tender. Later paræsthesiæ, nerve-tenderness, atrophy of muscles.

Excised piece of muscle, acute interstitial myositis with beginning cirrhosis of muscle; numerous Mastzellen.

Senator concludes that inflammation can begin primarily in the muscle and extend to the nerve, or *vice versa* the nerve may be primarily inflamed, the muscle secondarily. And believing, as he does, that the disease is of infectious origin, he thinks that the infectious material or the chemical poison may at one time affect one part of the motor mechanism, at another another. If localized in the cerebral motor areas, a cerebral paralysis will follow; in the anterior horns, a paralysis of the infantile spinal paralysis type; in the nerves, a peripheral neuritis; in the muscles, a myositis. Various combinations of these types he believes possible.

Somewhat similar views were expressed by Hoffmann, of Heidelberg, at a meeting of neurologists in Baden-Baden in 1894, his observations being made on a case of neuromyositis multiplex in a male, aged seventy years, that ran a fatal course in sixteen days.

In the discussion, Edinger and Siemerling agreed with Hoffmann as to the difficulty in diagnosis between the affections of many nerves and many muscles, and the former recalled the similarity between these cases and Kussmaul's periarteritis nodosa.

Handford reports a case of disseminated myositis and neuritis with hemiplegia, terminal gangrene, pigmentation of the skin, and followed by muscular atrophy.

Unverricht, in 1891, reported a second case. This was in a pregnant non-syphilitic woman, aged thirty-nine years. The muscles involved were those of the legs, abdomen, chest, and later the face. There were great pain, swelling, itching; the eruption was urticarial. Labor in the case was natural, uneventful; the child healthy. No excision of muscles allowed. After five months there was no muscular atrophy, no reaction of degeneration, and but a little tenderness and induration remaining. The great involvement of the skin and subcutaneous tissue led Unverricht to call this case one of dermatomyositis. He believes the disease is infectious; that possibly it is a primary dermatitis and secondary myositis, or *vice versa*.

Senator, in 1893, reports two cases of great interest:

CASE I.—Male, six years a diabetic, aged fifty years. Sick for two weeks with muscular pains, swellings, eruption resembling that of erythema nodosum, fever, typhoid state. Microscopic examination showed extensive interstitial myositis, with hemorrhages, increased nuclei, etc. No parasites or protozoa. Senator does not believe the diabetes had any influence in producing the myositis.

CASE II.—Male, aged forty years, early in June, 1893, ate some partially spoiled crabs. Suffered soon after from anorexia, sleeplessness, malaise, stiff, painful feelings in legs. The pains increased and by last of June a physician was consulted. There was moderate fever. The right upper and lower extremities were greatly swollen, resembling massive columns; the skin was reddened. There was pain in swallowing and in loud speech. An acute hemorrhagic nephritis occurred as a complication. Recovery ensued in August, 1893. Senator inclines to exclude trichinosis, and to look upon the case as an intoxication from the spoiled crabs.

Herz believes mild cases often go under the name of rheumatism. The probability of an infectious origin is strengthened by two favorable cases occurring in two girls occupying the same room, one case rapidly following the other.

He cites two cases with fatal results in the practice of Wermann, of Dresden. The involvement of the skin leads him to call the affection "dermatomyositis."

Lewy records four cases that he regards as polymyositis acuta, three being in the same family and seeming to indicate the possibility of contagion. The case occurring last was one of extreme mildness and looked upon by Lewy as an abortive polymyositis.

Lewy tabulates the cases reported up to 1893, and finds with his four cases twenty-one that he regards as acute polymyositis.

Buss, also, under the title dermatomyositis, reports a case in a male, aged twenty-two years, in whom there were acutely developing painful swellings in the muscles, hemorrhages with later discoloration of the skin, splenic tumor, hemorrhages from the bowels, stomatitis with oral hemorrhages, angina, effusion into left knee. Recovery in six weeks. There is, however, in this case such a striking resemblance to scurvy that one must hesitate before classing it as polymyositis in its restricted sense.

C. Boeck, in a case of polymyositis, where, through a misunderstanding as to directions, immense quantities of copaiba were rubbed into the skin, believed that the copaiba was the cause of the inflammation of the muscles as well as of the skin. The patient was a male, aged twenty-one years; gonorrhea two months before. For six days after the copaiba was stopped large quantities were eliminated by the urine. The well-known effect of copaiba on the vasomotor nerves of the skin leads Boeck to think it affected in this case the vasomotor nerves of the subcutaneous tissue and muscles as well.

Etiology. A study of the cases reported under the head of acute polymyositis still leaves us as much in the dark concerning the etiology as when Strümpell wrote in 1891, "The cause is yet entirely unknown."

There is a general belief in the infectious origin. In some cases, as in Waetzoldt's and Winckel's, micro-organisms were found in the muscles. These cases were, however, atypical and a definite puerperal infection was present. The fact that in some cases, *e. g.*, Prinzing's and Hepp's, ordinary methods of examination have failed to reveal bacteria lends color to the theory of an intoxication-myositis, but no toxin has yet been proven. Winckel believed in his case that a toxic fluid substance was more the cause of the myositis than the few bacteria found. Again, the occurrence in the lower animals of myositis due to animal parasites—protozoa—the presence in a man of a well-defined muscle-parasite, the trichina spiralis, has drawn attention to the possibility, or, as Pfeiffer believes, the probability, of many of these cases being due to a protozoon, a sporozoon of the group gregarinæ—myositis gregarinosa. Specimens from muscles have been submitted to Pfeiffer from the cases of Strümpell and Unverricht, but no evidence found of the protozoa. Still Pfeiffer contends that the method of preservation and preparation of the specimens is injurious to the easy recognition of the animal parasites, and that they may be present, though unrecognizable. He calls attention also to the fact that in the hog Virchow observed a skin-rash in a case of gregarinal myositis, strikingly analogous to the skin-lesions so frequently observed in the acute polymyositis of man.[1]

Lending color to the argument in favor of an infectious origin is the oft-observed splenic tumor, fever, angina. In some cases, too, possible infection atria have been noted in ulcerating pulmonary phthisis, tubercular ulcers of the intestine, a wound of the tongue, an infected uterus. Scriba, in cases of infectious myositis, believed a break in skin or mucous membrane gave entrance to the organism or virus.

Boeck's case seems to favor the intoxication-hypothesis, and possibly the case of Senator, where the stale crabs were eaten, would be looked upon as arguing in the same direction, yet one feels sure that Pfeiffer would contend that the crab may have been poorly cooked and infected with muscle-parasites. The cases of syphilitic myositis seem to indicate that toxic substances may be the exciters of inflammation of many muscles.

In this connection I cannot refrain from thinking that Wagner, in his case where trichinæ were found, has been almost too positive in ignoring entirely the trichinatous origin of the inflammation, even though sup-

[1] It is interesting in this connection to recall the fact that Klebs (Virchow's Zeitschrift, 1891) records a case of muscular atrophy in which he came to the conclusion, after repeated examinations of specimens, that the cause was a parasite which he calls *gregarina hyalogenes*. This parasite he took at first for muscle-nuclei.

ported by the authority of a Leuckart. While three trichinæ in three hundred sections are not many, they are still abnormal. And it is not impossible that the trichina in its progress to its final resting-place in the muscle—and its course is still unknown—may excite inflammation even in places where it does not lodge. It may, it is conceivable, carry with it or allow to escape with it through the intestinal wall, other microparasites or toxins.

A very interesting case of mixed infection with trichinæ and anthrax has been reported by Zörkendörfer from Chiari's laboratory. From the muscles of four persons dying during an epidemic trichinæ were found, but in small numbers, and only after most persistent search, even in acutely inflamed muscles. But in the muscles, in the heart blood, in the spleen, were found bacilli morphologically and in other particulars resembling anthrax-bacilli. In the sections were found marked interstitial myositis, an occasional trichina, and the anthrax-bacilli. These cases indicate that trichinosis can only be excluded after most diligent search, and that trichinæ may still be present in an inflamed muscle though not found in all or even any great proportion of the inflamed areas. It may be of interest to note that in examining some of the suspected sausage many Mieser's tubes (Miesersche Schläuche) were found.

The contagious character of the affection is hinted at by some observers, particularly Herz and Lewy. No cases have been reported in children.

Pathology. The inflammatory process in the muscle presents no peculiarities differentiating it from any other acute myositis. At times the process is chiefly interstitial, at times parenchymatous, again it is diffuse. The muscle-fibres frequently show waxy or hyaline degeneration; the striæ may be partially or wholly destroyed. There may be longitudinal splitting and vacuolation. Regenerative changes are prominent. Increase in nuclei is noted in almost every case. Large cells with solitary or multiple nuclei are frequently seen. Senator, in one of his cases, met three classes of cells: 1. The normal oval form, which on separate fibres can be seen in increased numbers; 2. Large oval cells with coarsely granular protoplasm and clearly visible nuclear body; 3. A cell a little smaller than the last, circular, distinctly stained, without visible nuclear body. I refer to this because in the specimen from my own case the large round or oval cells were very abundant. Hemorrhage is a part of the pathological process in most cases. Interstitial inflammatory changes are usually noted, the collection of round cells being very great. The subcutaneous tissue shows an inflammatory œdema. The involvement of the skin in erythema, urticaria, erysipelas-like inflammation, has led some observers to speak of the disease as dermatomyositis. The muscles involved are usually first those of the extremities, from which the process may extend to all the muscles of the body, including the face, the mus-

cles of respiration and of deglutition. In one case the heart-muscle was probably involved.

Pfeiffer, who examined the specimens from Unverricht's and Prinzing's cases, says that the characteristic change is the hemorrhagic inflammation in the interstitial structure between the muscles, with granular secondary degeneration of muscle-cells. The microscopic pictures, with nuclear proliferation, connective-tissue bands, and atrophy of muscle-cells, resemble those already mentioned as met with in infected horseflesh. Prinzing's case resembled the muscle of rabbits after the injection of sarcosporidia.

In some cases, notably those of Senator, the nerves had been demonstrably involved. Whether this is primary or secondary to the affection of the muscle, or whether both nerve and muscle are simultaneously affected, cannot be definitely decided. It is well to recall Senator's theory that there may be a common cause for this peculiar affection of the muscles, for some forms of peripheral neuritis, for inflammation of the anterior horns, and for some forms of encephalitis, this cause affecting at one time one portion of the motor tract, at another another portion, while again it may, as in cases of neuromyositis, affect the nerve and muscle together.

Symptomatology. The first pictures of the disease drawn by Wagner, Hepp, and Unverricht were quite well defined. The reports from later cases, however, necessitated a modification of these typical cases. Löwenfeld, from a study of the cases up to 1890, gave the following group of symptoms as characteristic of acute polymyositis: 1. A swelling of the extremities, due to the indurative œdema of the subcutaneous cellular tissue, and in part to the increased volume of the muscle. Joined with this is a corresponding functional disturbance in the affected member. 2. The spread of the inflammation to the muscles of respiration and deglutition, with corresponding loss of function in these muscles. 3. The appearance of a more or less extensive exanthem. Moderate fever, profuse sweats, splenic tumor, with death from inhalation-pneumonia or from suffocation, were common events. Since Löwenfeld wrote, favorable cases have been reported, and cases in which some of his classical symptoms have been absent. Strümpell calls attention to the fact that stomatitis and angina are common. Pigmentation of the skin has been reported. The muscles of the face, the tongue, the heart, and even the diaphragm, that were supposed to be commonly spared, have been found involved. The kidneys in two instances have been acutely inflamed. It is therefore clear that no definite complexus of symptoms can yet be described as peculiar to this affection, and no sharp line can be drawn until the etiological factor is better understood. It is not improbable that there are cases of myositis due to some definite organism or toxin, and other cases closely resembling these due to other organisms or toxins, just as

we have true cases of diphtheria due to a definite bacillus, and other cases simulating a true diphtheria due to other organisms. It is not improbable either that some cases—particularly the milder ones—classed as acute polymyositis may have been due to the virus of syphilis. In only a few reported cases is it specially stated that the patient was not syphilitic.

A most interesting observation is that made by Lewy in his three cases, where there was apparently a contagion. The second and third cases which he reports are, however, extremely light, the third case, as he himself says, if it is a case of polymyositis, being one without inflammation of muscles, without general disturbance, with nothing but a purpuric rash, and only regarded as a case of polymyositis because occurring in a family where two other cases had been present, each with the same purpuric lesion. It is, in other words, an abortive polymyositis. Here the diagnosis is only probable, as no accurate standard is yet known.

The diagnosis of this condition presents two chief difficulties, the differentiation from trichinosis and from polyneuritis. Among other affections that should be remembered must be mentioned pyæmic abscesses, multiple thromboses, periostitis and osteomyelitis, rheumatism.

From trichinosis it can in some cases only be diagnosed by the excision of the muscle and a thorough examination for the parasite. As aids to diagnosis may be mentioned the fact that in acute polymyositis there is not the history of eating uncooked or raw pork, and it is the exception that other members of the family or household should be affected. Secondly, the primary gastric and intestinal symptoms are more pronounced in trichinosis. Thirdly, in trichinosis there are early and prominent symptoms of involvement of the muscles of the eye and of the diaphragm. The latter is commonly spared in acute polymyositis; yet it must be remembered that in Strümpell's case the eye, and in Wagner's late case, the diaphragm, were involved. Lastly, the exanthem is usually more pronounced in polymyositis than in trichinosis.

From polyneuritis the disease is differentiated by the following facts: In acute polymyositis there is, 1. No nerve-tenderness. 2. No anæsthesia or paræsthesia. 3. The skin is not trophoneurotic as in neuritis. 4. The paralysis is due merely to mechanical interference. 5. Skin and muscles in polymyositis are peculiarly œdematous. 6. There is no rapid muscular atrophy. The reflexes and electrical reaction are as yet of uncertain value in making a differential diagnosis. (Senator.) The possibility of combinations of these two forms should, of course, be remembered.

Prognosis. The prognosis, at first uniformly regarded as fatal, must now be modified. It can be said in general that the severer the onset, the greater the number of muscles involved, the higher the temperature, the graver the prognosis. The involvement of the muscles of respiration

and of deglutition results usually in death from inhalation-pneumonia. Myocardial involvement gives the added danger of cardiac failure.

Therapy. Until the cause is known treatment is purely symptomatic.

Myositis Syphilitica. The literature on syphilis of the muscles is rather imperfect and meagre. Two forms are recognized, the gummous or circumscribed, the diffuse, and, according to some, a combined form. I make free use in what I say of syphilitic myositis, of a monograph by Lewin in the *Charité Annalen*, 1891.

Ricord in 1842 was the first to characterize an interstitial myositis, distinguishing it from the gummous, as a special form of syphilitic infection.

The microscopic changes in this form of myositis are very nearly identical with those described as characterizing acute polymyositis. There is marked interstitial infiltration with round cells. Later, if the disease is subacute or chronic, the development of fibrous tissue with contraction and induration plays a prominent part. Proliferating changes are present in the muscle-nuclei. The increase in muscle-bodies can reach a high grade. "The cells are seen arranged in varied forms in thoroughly compacted groups of from three to fifteen. These proliferating cells lie in part between the peripheral bundles, and in part press themselves into the same." The muscular fibres lose somewhat their staining capacity, may become pale, their contents granular, the striæ lost, fibres smaller and perhaps longitudinally split.

Lewin, while admitting that gummata may develop later in a muscle that is diffusely inflamed, does not believe that interstitial or diffuse syphilitic myositis is "a stepping-stone between the irritative stage and the gummous" any more than is an interstitial orchitis or hepatitis.

Ostermayer believes in a combined form where, in addition to the diffuse inflammation involving the entire muscle and producing the board-like hardness, there is a circumscribed, nodular gummous mass tending to break down, and, as in Ostermayer's cases, three in number, to discharge through the skin as a fistula or ulcer. This form he plainly differentiates from the multiple gummata of a single muscle, where several nodules are scattered through a muscle with intervening healthy tissue. In his combined form there is an involvement of the entire muscle with, in one place, a gumma. He regards the case of Bramann (*Berl. klin. Woch.*, 1889), that Lewin looks upon a diffuse syphilitic myositis with later development of gumma, as an excellent example of the mixed form.

Etiology. Lewin finds records of forty-five cases, six of which occurred in his own practice. Twenty-six were males, fifteen females. Occupation seemed to have no influence in the production of this affection. The age agreed with the age at which syphilis in general appears. From the sixteenth to the fortieth year the majority of cases were found. The cases were met with in strong, vigorous adults in private practice,

as well as in frail, weak, anæmic hospital prostitutes. Lewin believes that previous failure to treat syphilis makes the later manifestations, including myositis, more severe. The time of its appearance varied. In several cases it occurred within one year after infection; in other cases as late as fifteen years after infection. Jullien found one case in the secondary period of syphilis, one four, one four and a half, one five, one five and a half, and one seven years after infection. Ostermayer regards syphilitic myositis as distinctly a late manifestation, only exceptionally early. Complicating the myositis the syphilitic exanthemata were frequently observed—macular, papular, squamous being reported. Ulcerating and nodose skin-lesions, condylomata, ulcers of the pharynx, exostoses were also concomitants of the muscle-inflammation. The muscles affected were varied, oftenest the biceps brachii. The left biceps muscle was affected more frequently than the right, so that Lewin is inclined to exclude excessive work or strain upon the muscles as a cause of the localization of the syphilitic process. Next in frequency may be mentioned the external sphincter ani—Neumann emphasizing the fact of the frequency of this location—the masseter, the deltoid, the sterno-cleido-mastoid, the gastrocnemius. One muscle was affected in twenty-one cases, several muscles in twenty-three cases. No definite exciting cause, as a blow, a cold, straining, could be found.

Symptomatology. Pain calls attention to the affected muscle. Lewin and Billroth both believe the pain is due more to the involvement of the bone and periosteum than to the affection of the muscle itself. Radiating pain is not uncommon. The pain may be nocturnal. The muscle naturally becomes somewhat weak. Pain prevents an accurate test of its strength. Flexion and pseudo-joint contractures may occur. In cases of doubt chloroform can be employed showing that the joint itself is uninjured. Spasm of the muscle is common. One of Gujot's patients broke a molar tooth through spasm of the masseter. Tenesmus, where the sphincter ani is involved, is very annoying. In Lewin's case, where the gastrocnemius was involved, the extension of the foot produced painful attacks of cramp. In the case which I report, severe pain was produced by extension of the foot, and there was a fairly well-marked ankle-clonus. Redness, swelling due to œdema, and increase in volume of the muscle are to be noted. Following the pseudo-hypertrophy of the muscle there may be atrophy and induration due to the development of connective tissue. Later fatty degeneration or ossification may occur. In some cases of extensive atrophy it is probable that the nerve itself was involved. As to site of election no one muscle seems to be preferred.

In the differential diagnosis a history of syphilis with other evidences of it are, of course, of great value. The diagnostic employment of anti-syphilitic remedies is of great value. It must be differentiated from rheumatism of the joint and of muscles, from inflammation of tendons, from

lumbago, from tetanus, from torticollis, from tumors, from cold abscesses, from exostoses, from mumps and facial paralysis, from trichinosis, from acute polymyositis.

The treatment consists in massage, electricity, the application of wet dressings, the use of mercury and potassic iodide. The disease may disappear rapidly or may be slow in yielding. Myotomy has been employed where the sphincter ani has been involved.

In the case I have reported four diagnoses come up for consideration —polyneuritis, trichinosis, polymyositis acuta, myositis syphilitica.

Polyneuritis is excluded by the peculiar limitation of the disease to regions of separate muscles and not separate nerves, by the absence of pain except on movement or pressure, by the absence of nerve-tenderness, paræsthesiæ, trophic changes, atrophy and paralysis, by the increased knee-jerk.

Trichinosis I exclude by the positive statement of the patient that she had not for several weeks before becoming ill eaten pork in any form, by the total absence of gastro-intestinal symptoms, by the limitation of the affection to three muscles, the diaphragm- and eye-muscles being spared, and by the failure to find trichinæ in the excised piece of muscle.

The case seems to have been one of acute polymyositis or of syphilitic myositis. If belonging to the former class, it is atypical in its benign course, involvement of a comparatively few muscles, absence of splenic tumor, of exanthem, of profuse sweats, persistence of patellar reflex. In the presence of definite symptoms of previous syphilitic infection and of the present activity of the syphilitic virus (adenopathy), and with a knowledge that syphilis does, though rarely, attack a muscle or muscles, producing a diffuse inflammation, one feels justified in regarding this as a case of syphilitic myositis. This I believe to be the fact notwithstanding the patient's and her physician's statement that no antisyphilitic remedies had been given before her entrance into the hospital, at which time there was but a slight relic of the affection in the muscle first inflamed. Syphilitic processes not infrequently in the primary, secondary, and even tertiary periods undergo spontaneous recovery or are apparently self-limited. And in this case there had been applied to the muscle first affected an ointment containing the antisyphilitics iodine and iodide of potassium, and this may well account for the somewhat rapid disappearance of the swelling in the two muscles first affected, over which muscles alone it was used.

The circumscribed, freely movable, and softer character of the swelling in the supinator longus, even though the muscle is itself a smaller one, suggests the possibility of the gummous character of the lesion. While there can be no question of the diffuse nature of inflammation in the calf-muscles of the two legs—using the word diffuse as implying an involvement of the entire muscle and not of some limited area—the fact

that on cutting into the muscle a rather thick, brownish-red, sterile fluid was encountered, makes one think that possibly here a small gumma had broken down. In other words, there are, it seems to me, some grounds for regarding the case as one of mixed or combined syphilitic myositis as described by Ostermayer.

Conclusions. 1. There is a definite disease primarily affecting many muscles of the human body and described as polymyositis acuta, pseudo-trichinosis, or dermatomyositis.

2. Inflammatory swelling of muscles, exanthem, splenic tumor, extension to the muscles of deglutition and of respiration, death, characterize the most typical cases.

3. Atypical and milder cases indicate that either the disease may run a benign course or that in the absence of definite means of differential diagnosis forms etiologically differing are confused.

4. Trichinosis and polyneuritis must always be excluded.

5. Syphilis may attack many muscles and, resembling acute polymyositis, must be excluded.

6. The etiology is still unknown.

7. Three hypotheses can be advanced as to its cause: 1. That it is due to a specific micro-organism (vegetable parasite). 2. That it is due to a chemical poison (toxin). 3. That it is due to an animal parasite (gregarina).

8. In doubtful cases the excised piece of muscle should be examined not alone for trichinæ and bacteria, but as well, by special methods, for protozoa.

9. Failure to find trichinæ in all areas showing inflammatory reaction, or even in the majority of such areas, does not exclude trichinosis as the primary cause of the myositis. Only repeated failure to find trichinæ after thorough examination enables one positively to assert that the case is not one of trichinosis. (Compare examination of sputum or tissue for tubercle-bacilli.)

10. Syphilitic myositis occurs in three forms—the gummous, the diffuse, the combined.

11. The diffuse syphilitic myositis is usually a late manifestation of syphilis; appears without definite exciting cause; affects no particular muscle by preference; often involves more than one muscle; may resemble acute polymyositis.

My thanks are due to Drs. S. G. West, G. H. Weaver, E. R. Le Count, D. D. Bishop, and Lawrence Ryan for kind assistance in the observation of this case and in the preparation and examination of bacteriological and microscopical specimens.

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